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Violence Against Women in Selected Areas of the United States

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Human Participant Protection

The study was reviewed and approved by the institutional review boards at each of the study sites and collaborating institutions, and a Certificate of Confidentiality was obtained.

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Abstract

Objectives—We determined the prevalence of recent emotional, physical, and sexual violence against women and their associations with HIV-related risk factors in women living in the United States.

Methods—We performed an assessment of women ages 18 to 44 years with a history of unprotected sex and 1 or more personal or partner HIV risk factors in the past 6 months from 2009 to 2010. We used multivariable logistic regression to examine the association of experiencing violence.

Results—Among 2099 women, the prevalence of emotional abuse, physical violence, and sexual violence in the previous 6 months was 31%, 19%, and 7%, respectively. Nonmarried status, food insecurity, childhood abuse, depression symptomology, and posttraumatic stress disorder were significantly associated with multiple types of violence. All types of violence were associated with at least 3 different partner or personal HIV risk behaviors, including unprotected anal sex, previous sexually transmitted infection diagnosis, sex work, or partner substance abuse.

Conclusions—Our data suggested that personal and partner HIV risk behaviors, mental illness, and specific forms of violence frequently co-occurred in the lives of impoverished women. We shed light on factors purported to contribute to a syndemic in this population. HIV prevention programs in similar populations should address these co-occurring issues in a comprehensive manner.

Violence against women is increasingly recognized as a critical national public health concern in the United States, as evidenced by the recent signing of the Violence Against Women Act by President Obama.[1] Based on nationally representative samples, it is estimated that in their lifetime, nearly 1 in 3 US women has survived physical violence, and 1 in 10 has survived rape.[2] Women who experience emotional, physical, and sexual violence not only experience the injury of the initial trauma, but also have higher rates of depression, posttraumatic stress disorder (PTSD), substance abuse, revictimization, and high-risk sexual behaviors.[3–7]

There is strong evidence that supports the relationship between experiencing intimate partner violence (IPV) and HIV risk, as well as acquiring HIV.[8–20] In the United States, the

relationship between IPV, especially sexual violence, and HIV came to light almost 20 years ago.[5] Several studies[6,10,17,18,20,21] during the past decade reported high co-occurring rates of violence, HIV risk, mental illness, and substance use in the United States among incarcerated women,[22] female substance users,[19] women in shelters,[23,24] women living in impoverished areas,[25–28] and women engaging in prostitution.[29] Not only do these conditions frequently co-occur, but the presence of one may magnify the effects of the others, thus demonstrating the notion of a "syndemic," which is a term used to refer to a set of synergistic or intertwined and mutually enhancing health and social problems facing vulnerable populations such as women living in poverty.[30] However, interpretation and generalizability across studies has been difficult because of small sample sizes, convenience samples (e.g., women in methadone treatment, shelters, or clinics), narrowly defined study populations, the inclusion of both women living with HIV and women living without HIV, and poorly standardized study variables that typically did not include emotional abuse (e.g., combining different types of violence or combining childhood and adult violent experiences).[5,6,10,31]

Overall, most published US data have suggested that women living with HIV experience IPV at the same rate as women not living with HIV from the same population, but that women living with HIV experience such violence more frequently and with increased severity.[9,31] In addition, substance abuse, poverty, and other HIV risk factors were associated with experiencing violence and therefore, also contribute to the HIV and IPV relationship.[9,32] However, many of these studies focused on "intimate" partner violence specifically and not on violence overall. For example, using a large representative sample of US women (n =13 928), Sareen et al.[8] found that women who experienced any IPV in the past year were more than 3 times as likely to report an HIV/AIDS diagnosis by a health professional as women who had not experienced IPV. They postulated that nearly 12% of HIV/AIDS infections among US women in intimate relationships was caused by IPV. Despite its novel contribution to the examination of the relationship between HIV infection and IPV among US women, this study was limited because it only examined physical and sexual IPV in the past 12 months. Another large-scale domestic study by Stockman et al. assessed specific types of sexual coercion in a nationally representative sample of 5857 US women and found positive associations among coerced sex, using drugs and alcohol, and having multiple sexual partners.[20] However, this study was limited in the way it assessed HIV risk by not examining perceived partner risk factors. Other recent studies have further elucidated this complex clustering of risk factors, but sample sizes have remained small, and measures of sexual HIV risk behaviors have varied widely.[9,33,34]

Because of the concentration of HIV/AIDS in key areas of the United States, the HIV Prevention Trials Network (HPTN) study 064 was uniquely designed to recruit a representative sample of women living in US areas with high poverty and a high prevalence of HIV.[26,27] Unlike the more diffuse HIV epidemics seen in other countries, HIV in the United States has striking socioeconomic and racial disparities that are concentrated in key "hot spots" of the Northeast, South, and West. However, HIV among women in the United States is still not fully appreciated in the current HIV prevention research.[26,27] HPTN 064 made a significant public health contribution by assessing key social and behavioral factors that contribute to HIV acquisition among women in the United States by exploring the risk

of HIV infection among certain populations of US women and providing information about their risk behaviors.[35] We used this large data set to assess the following: (1) the prevalence of emotional abuse, physical violence, forced sex, and experiencing 2 or more types of violence; and (2) sociodemographic characteristics, personal HIV-risk behaviors, and perceived sex partner behaviors associated with each type of violence.

METHODS

We used baseline data from the HPTN 064, the Women's HIV SeroIncidence Study for our analyses. HPTN 064 was a multisite, prospective observational cohort study that has been described in detail elsewhere.[35] Briefly, we used ethnographic mapping and venue-based sampling to enroll 2099 women from 10 urban and peri-urban communities in 6 geographic areas in the United States (i.e., Atlanta, GA; Baltimore, MD; New York City, NY; Newark, NJ; Raleigh-Durham, NC; Washington, DC) with high rates of poverty and HIV.

As part of the eligibility criteria, participants had to reside in census tracts that were in the top 30th percentile of HIV prevalence for that area, which also had at least 25% of residents living below the US federal poverty threshold, as defined by the 2008 US Census Bureau.[36,37] Other eligibility criteria included being between the ages of 18 and 44 years, self-identifying as a woman, having at least 1 episode of unprotected vaginal or anal sex with a man in the 6 months before enrollment, and willingness to undergo HIV rapid testing and receive HIV test results. In addition, potential participants had to report at least 1 additional personal or partner HIV risk behavior in the past 6 months (e.g., drug use, sexually transmitted infection [STI] diagnosis, binge drinking, or exchanging sex) or incarceration in the past 5 years. Women were ineligible if they reported a history of a positive HIV test, current enrollment in an HIV prevention trial, current or past participation in an HIV vaccine trial, or anticipated absence from the community for more than 2 consecutive months during the follow-up period.

We recruited for and enrolled women in the study between May 2009 and July 2010. We obtained informed consent before the initiation of study procedures. Participants received monetary reimbursements for their time and travel to all study visits. The reimbursement amount varied by study site and was approved by the site institutional review board. Audio Computer-Assisted Self-Interviewing (ACASI) was used to collect data at behavioral baseline, and at 6 and 12 months.

Measures

Experiences of emotional abuse, physical violence, and forced sex, and experiencing more than 1 form of violence or abuse in the previous 6 months were self-reported via ACASI using the following 3 questions for which responses were coded yes or no: (1) “in the last six months, have you been emotionally abused by your partner or someone important to you? Examples of emotional abuse include: when someone makes you feel bad about yourself by calling you names, making you think you are crazy, humiliating you, making you feel guilty”; (2) “in the last six months, have you been hit, slapped, kicked, or physically hurt by someone important to you”; and (3) “in the last six months, have you been forced to have any type of sex?” If a participant reported experiencing more than 1 form of violence

or abuse, we considered them survivors of multiple violent experiences. Childhood abuse was also assessed using 1 dichotomous question that asked the participant “As a child, (less than 18) were you abused physically, emotionally, or sexually?”

We also collected baseline demographic and socioeconomic information at enrollment from all study participants who provided consent. We defined food insecurity as “concerns about having enough food for yourself and family in the past six months.” We categorized housing as (1) currently owning or renting your home; (2) living with a sexual partner, friend, or parent; or (3) all other forms of unstable housing (i.e., halfway house, homeless shelter, hotel, abandoned building, etc.). We categorized recruitment sites as northern sites, which included New York and Newark; mid-Atlantic sites, which included Baltimore and Washington DC; and southern sites, which included Raleigh-Durham and Atlanta. We measured depressive symptomology in the past week using a shortened 8-item version of the Center for Epidemiologic Studies–Depression Scale.[38,39] A score of 7 or greater on a 4-point scale ranging from 0 to 3 was indicative of depressive symptoms. Similarly, we evaluated symptoms of PTSD in the past 6 months using the Primary Care PTSD Screen.[40] Evidence of PTSD was based on a score of 3 on the 4-item dichotomous PTSD scale. We used dichotomous variables derived from these scales in our analysis.

The ACASI also assessed HIV risk in the past 6 months, including unprotected vaginal sex, unprotected anal sex, multiple sexual partners, concurrent male sexual relationships, participant reported history of a STI (i.e., gonorrhea, syphilis, or chlamydia), commercial sex work, and exchanging sex for commodities, including drugs, money, food, or housing. We assessed substance use using a modified World Health Organization Alcohol, Smoking and Substance Involvement Screening Test scale.[41] Specifically, we measured at least weekly binge drinking by asking participants “how often do you have four or more drinks on one occasion?” Drug use was assessed by asking “in the past six months, how often have you used [illicit drugs]?”

In addition, we used items from the eligibility assessment to assess perceived HIV risk behavior of any male sex partners within the past 6 months, including injected or noninjected illicit drug use (except for cannabis), binge drinking (≥ 5 drinks on 1 occasion), and incarceration in the past 5 years. Indirect concurrency was obtained from the participant's baseline assessment and was defined as the participant's belief that at least 1 of her 3 most recent male sexual partners “definitely” had another sexual partner while in a sexual relationship with the participant.[42]

Statistical Analyses

We conducted bivariate analyses between covariates and each type of violence using logistic regression. For each of the 4 violent experiences (i.e., emotional abuse, physical violence, sexual violence, and experiencing more than 1 form of violence or abuse), bivariate relationships for which $P < .1$ were included in multivariable logistic regression analyses. In multivariable analyses, associations with $P < .05$ were considered statistically significant. Pairwise odds ratios with 95% confidence intervals (CIs) were calculated to examine the association between types of violence. All analyses were performed using SAS version 9.2 (SAS Institute, Cary, NC).[43]

RESULTS

The demographic characteristics profile of our sample of 2099 women was described in detail elsewhere.[35] In brief, 86% of participants were African American, with a median age of 29 years. Most reported having a high school diploma or less (74%), being nonpartnered (67%), and being unemployed (64.7%). At baseline, 44% had an annual household income of less than $10 000, and 46.3% reported food insecurity. Nearly 35% and 29% reported symptoms of depression or PTSD, respectively. Forty-five percent reported childhood abuse (Table 1).

The overall baseline prevalence of emotional abuse, physical violence, forced sex, and experiencing 2 or more types of violence in past 6 months were 31%, 19%, 7%, and 17%, respectively (Table 1). Table 2 includes results from bivariate analyses between covariates (sociodemographic characteristics and HIV risk) and violence outcomes. Many bivariate relationships were significant; however, race, ethnicity, education, poor health status, and unprotected vaginal sex were noteworthy exceptions.

Independent associations between types of violence and dependent variables from a multivariable model are shown in Table 3. Relative to participants who did not report emotional abuse, the odds of being food insecure were 1.8 times higher, surviving childhood abuse were 2.0 times higher, having symptoms of depression were 1.8 times higher, and having symptoms of PTSD were 2.0 times higher for those who experienced emotional abuse (all $P < .001$). Living with parents, partner, or friends was significantly associated with emotional abuse (adjusted odds ratio [AOR] = 1.40; 95% CI = 1.09, 1.80; $P < .01$). Several HIV risk factors were also significantly associated with emotional abuse, including exchanging sex for commodities (AOR = 1.40; 95% CI = 1.06, 1.85; $P < .05$), having a previous self-reported STI diagnosis (AOR = 1.52; 95% CI = 1.08, 2.16; $P < .05$), having a binge-drinking partner (AOR = 1.58; 95% CI = 1.25, 2.01; $P < .01$), and reporting indirect concurrency (AOR = 1.53; 95% CI = 1.18, 1.97; $P < .01$).

Physical violence in the past 6 months was significantly associated with younger age ($P < .05$) and not being married, but living with a partner ($P < .05$; Table 3). The odds of being food insecure or experiencing symptoms of depression were nearly 2 times higher among participants who reported physical violence in the past 6 months compared with participants who did not report physical abuse ($P < .001$). Physical violence was also associated with childhood abuse (AOR = 1.71; 95% CI = 1.28, 2.27; $P < .01$). Engaging in unprotected anal sex (AOR = 1.47; 95% CI = 1.11, 1.96; $P < .01$), having a drug-using sexual partner (AOR = 1.41; 95% CI = 1.02, 1.96; $P < .05$), and experiencing indirect concurrency (AOR = 1.40; 95% CI = 1.03, 1.89; $P < .05$) were significantly associated with experiencing physical violence.

Participants who reported being forced to have sex in the past 6 months had 2.9 times higher odds of being nonpartnered ($P < .05$), 2.6 times higher odds of identifying as a commercial sex worker ($P < .05$), and 2.4 times higher odds of experiencing PTSD symptoms ($P < .01$). In addition, forced sex was associated with unprotected anal sex (AOR = 1.68; 95% CI =

1.10, 2.57; $P < .05$) and having a drug-using sexual partner (AOR = 1.91; 95% CI = 1.18, 3.07; $P < .01$).

Experiencing 2 or more types of violence in the past 6 months was significantly associated with not being married ($P < .05$) and living with a sexual partner, friend, or parent ($P < .01$) (Table 3). Similar to other violence variables, participants who reported multiple forms of violence in the past 6 months had nearly twice the odds of reporting food insecurity ($P < .001$), childhood abuse ($P < .01$), and symptoms of depression ($P < .001$) compared with participants who did not report multiple forms of violence. Multiple types of violent experiences were also associated with PTSD symptoms (AOR = 1.69; 95% CI = 1.21, 2.35; $P < .01$), engaging in unprotected anal sex (AOR = 1.61; 95% CI = 1.19, 2.19; $P < .01$), having a drug-using sexual partner (AOR = 1.46; 95% CI = 1.04, 2.05; $P < .05$), having a binge drinking sexual partner (AOR = 1.40; 95% CI = 1.02, 1.92; $P < .05$), and experiencing indirect concurrency (AOR = 1.56; 95% CI = 1.13, 2.16; $P < .01$) (Table 3).

Pairwise odds ratios between types of violence were also calculated. All forms of violence were highly correlated (all $P < .001$). Specifically, the odds ratio between emotional abuse and physical violence was 14.3 (95% CI = 11.00, 18.75); between emotional abuse and sexual violence, the odds ratio was 7.8 (95% CI = 5.31, 11.56); and between physical violence and sexual violence, the odds ratio was 9.8 (95% CI = 6.85, 14.04).

DISCUSSION

In our sample, nearly 1 in 3 women reported experiencing some form of violence in the past 6 months. Emotional abuse, which is an under-studied form of violence against women that has been associated with serious mental and physical health outcomes, was the most commonly reported type of violence.[44–46] Violent or abusive experiences had multiple associations, including marital status, food insecurity, housing stability, symptoms of depression and PTSD, childhood abuse, unprotected anal sex, sex work, and having a partner believed to be engaged in drug use, binge drinking, or a concurrent sexual relationship. Although differences in research design and assessment made it difficult to compare our findings across studies,[47–49] our study added to the existing literature by systematically sampling young women living in impoverished areas of the United States with a high prevalence of HIV. Our results demonstrated that violence is a common experience within this population of women, and that this experience is associated with several other factors that increase the risk of acquiring HIV.

However, there were key variations across demographic variables that should be highlighted. In bivariate analysis, race/ethnicity was not associated with violence, but poverty represented by measuring food insecurity was strongly linked to 3 types of violence in both bivariate and multivariable analyses. Although our results could not determine causality, several posited pathways might explain the relationship between violence and food insecurity, which has been found among other groups of impoverished women.[50] One potential pathway was that women who were being abused might be denied access by their abuser to financial resources and employment opportunities necessary to purchase food, and subsequently, these women became food insecure.[32,51,52] Another reason was that women

who left abusive situations might be at greater risk of becoming food insecure because of the drastic socioeconomic changes that result after leaving a financially supportive abuser.[51] Lastly, both violence and food insecurity are associated with poverty, and therefore, both were more likely to occur among residents of impoverished areas.[51] Impoverished women tend to lack the social resources, instrumental support, and educational and economic opportunities available to more financially stable women. Consequently, these women might be less likely to leave financially supportive abusers.[32] Structural interventions designed to reduce community-level economic disadvantage and to improve the financial stability (e.g., microfinance and financial empowerment) of US women of various racial/ethnic groups might be promising approaches to prevent violence overall and in specific US communities.[32,53]

The poverty experienced by our sample might also contribute to violence rates through its association with marital instability.[54,55] Consistent with previous research,[56] marriage had a protective influence against violence, which might be caused by more stable relationships, more protective resources, or having partners who were more invested in sustaining the relationship. However, only 7.5% of our sample was married. Low marriage rates are common in impoverished communities, especially in predominantly African American communities, because of fewer men who are financially able to support a family and the low gender ratios between men and women.[54,55,57]

All forms of violence were associated with experiencing symptoms of depression or PTSD. This relationship was strongest among survivors of forced sex and survivors of multiple types of violence. Numerous other studies have found similar results.[58–61] There was empirical evidence for both a bidirectional and a causal relationship between experiencing violence and symptoms of depression.[62] It was suggested that poverty played a role in this relationship because of its association with both mental health outcomes and violence against women.[61] Our findings reiterated the critical need for trauma-informed mental health care for survivors of violence, especially in impoverished communities.

Consistent with the current literature that examines the relationship between sexual risk behaviors and violence,[4–6,63] we found that experiencing any form of violence was associated with participation in sexual risk behaviors that increased the risk of acquiring HIV, either directly (i.e., exchanging sex, identifying as a commercial sex worker, and having unprotected anal sex) or indirectly (i.e., having a sexual partner who is believed to engage in HIV risk behaviors). Interestingly, we did not find a significant relationship between unprotected vaginal sex and any type of violence. However, we did find significant associations between experiencing physical violence, forced sex, and multiple types of violence, and unprotected anal sex. Although research has shown that experiencing violence impairs a woman's ability to successfully negotiate condom use with future male sexual partners, there were mixed results in studies that examined the relationship between unprotected sex and violence.[6,64] These results might be because of a failure to separate anal and vaginal sex. Future research that examines condom use among survivors of violence should specify type of sex, especially because anal sex is associated with greater risk of HIV transmission.[65]

Although we did not limit our measurement of violence to IPV, perceived partner HIV risk behaviors were still important to consider, because participants who experienced some form of violence were more likely to have male sexual partners who they perceived as exhibiting HIV risk behaviors, including drug use, binge drinking, or indirect concurrency. Previous research substantiated a strong relationship between substance use and perpetrating violence, as well as experiencing violence.[66] Our findings were similar to the findings by Coker et al., who found that partner drug use and binge drinking, as reported by the participant, were associated with experiencing different types of violence even after controlling for the participant's substance use.[67]

Numerous studies have examined the relationship between violence and HIV among men and women.[8–1,32] However, our study contributed to the existing literature by using a large data set to examine the association between 4 specific forms of violence against women, including emotional abuse and several well-defined personal and perceived partner HIV risk behaviors. As a result, our findings might elucidate details not previously explored about the posited factors involved in the syndemic relationship among poverty, mental illness, violence, and HIV risk in impoverished US women.[6,23,29,31,34,68,69] The role of emotional abuse was of particular interest, because it is rarely examined as a standalone form of violence. The similarity of the constellation of associated factors for emotional abuse and physical violence compared with forced sex suggest the need for additional examination of the details surrounding the violence experienced rather than just if violence occurred.

The presence of a syndemic would indicate that HIV prevention programs among similar populations should be comprehensive, should address these co-occurring issues, and should broadly focus on contextual factors that influence HIV risk behavior. More research, particularly longitudinal research, is needed to improve our understanding of syndemic relationships, and thereby, to develop effective interventions for vulnerable women living in the United States. Although several behavioral HIV prevention studies included violence prevention content, only a handful of interventions addressed these complex relationships by including changes in violence measures as a primary endpoint or by recruiting survivors of violence as the study population.[12,53,70–77]

However, to date, most of these large-scale interventions were conducted outside of the United States.[76] One potential reason for this gap is the lower HIV incidence rates in the United States; studies such as these would require much larger sample sizes than those in locations with higher HIV rates. Consequently, limiting studies to the use of HIV endpoints, which are preferred in HIV prevention research, results in limited data regarding US women. However, the unique structural, cultural, socioeconomic, and political factors that influence violence against women and HIV risk among US women limit generalizability from international research and necessitate further research among US women. Therefore, the use of HIV-related proxy measures and HIV incidence modeling may need to be considered so that this critical research can be conducted among US women. To narrowly focus prevention efforts in the United States on interventions that decrease HIV risk behaviors without considering the greater context of the at-risk population may result in brief, short-lived changes in HIV risk behaviors without substantial long-lasting impact on HIV incidence. The literature is replete with examples of HIV interventions (both behavioral and

biomedical) that had limited or no efficacy to prevent HIV infection, perhaps because of the somewhat narrow understanding of the broader context of the study populations.[78–80]

Limitations

Our study had several strengths, including the collection of potentially sensitive data using ACASI technology to minimize social desirability bias. In addition, we recruited a large sample of understudied women from communities in the United States that experienced high poverty and had a high prevalence of HIV, and we assessed the prevalence and factors associated with specific types of violence within this population, which was a major contribution to the literature. Limitations of this study must also be considered when interpreting our findings. Data were collected from a defined study population using strict eligibility criteria to recruit women thought to be at highest risk for HIV acquisition in the United States. In addition, because our primary aim was to assess HIV seroincidence, the quantitative assessment instrument was designed to be concise and clear, which limited the number and depth of the assessment items. As a result, details about lifetime experiences with violence, as well as the perpetrator(s), severity, and duration of the violence were not assessed. The absence of these details, including gender-specificity, severely limited our understanding of the role of violence in the lives of our study population. Future research using more in-depth quantitative measures and qualitative data with similar populations is recommended. Lastly, our data were vulnerable to several types of bias, including misclassification, recall, and social desirability biases, which could potentially attenuate the relationships investigated and bias our results toward the null. However, our use of ACASI, shorter recall periods, thorough interviewer training, and extensive attention to assessment design all minimized these threats to validity by reducing underreporting, which is a major concern when assessing sensitive topics such as violence and sex risk.[48,49,81,82]

Conclusions

We identified a 31% prevalence of violence among impoverished US women at high risk for acquiring HIV and described key associations between specific types of violence and behaviors that increase the risk of HIV acquisition. The regularity with which our participants experienced violence and the relationships examined in our findings highlighted the need for comprehensive trauma-informed HIV prevention interventions for similar populations of women.

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References

1. Calmes, J. [January 11, 2015] Obama Signs Expanded Anti-Violence Law.. New York Times. Mar 7. 2013 Available at: http://thecaucus.blogs.nytimes.com/2013/03/07/obama-signs-expanded-anti-violence-law.
2. Breiding, MJ.; Chen, J.; Black, MC. Intimate Partner Violence in the United States - 2010. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention; Atlanta, GA: 2014.
3. Manfrin-Ledet L, Porche DJ. The state of science: violence and HIV infection in women. J Assoc Nurses AIDS Care. 2003; 14(6):56–68. [PubMed: 14682069]
4. García-Moreno C, Watts C. Violence against women: its importance for HIV/AIDS. AIDS. 2000; 14(suppl 3):S253–S265. [PubMed: 11086869]
5. Maman S, Campbell J, Sweat MD, Gielen AC. The intersections of HIV and violence: directions for future research and interventions. Soc Sci Med. 2000; 50(4):459–478. [PubMed: 10641800]
6. Meyer JP, Springer SA, Altice FL. Substance abuse, violence, and HIV in women: a literature review of the syndemic. J Womens Health (Larchmt). 2011; 20(7):991–1006. [PubMed: 21668380]
7. Stockman JK, Hayashi H, Campbell JC. Intimate partner violence and its health impact on ethnic minority women. J Womens Health (Larchmt). 2014 Epub ahead of print.
8. Sareen J, Pagura J, Grant B. Is intimate partner violence associated with HIV infection among women in the United States? Gen Hosp Psychiatry. 2009; 31(3):274–278. [PubMed: 19410107]
9. Kouyoumdjian FG, Findlay N, Schwandt M, Calzavara L. A systematic review of the relationships between intimate partner violence and HIV/AIDS. PLoS ONE. 2013; 8(11):e81044. [PubMed: 24282566]
10. Stockman JK, Lucea MB, Campbell J. Forced sexual initiation, sexual intimate partner violence and HIV risk in women: a global review of the literature. AIDS Behav. 2013; 17(3):832–847. [PubMed: 23143750]
11. Li Y, Marshall C, Rees H, Nunez A, Ezeanolue E, Ehiri J. Intimate partner violence and HIV infection among women: a systematic review and meta-analysis. J Int AIDS Soc. 2014; 17:18845. [PubMed: 24560342]
12. Jewkes RK, Dunkle K, Nduna M, Shai N. Intimate partner violence, relationship power inequity, and incidence of HIV infection in young women in South Africa: a cohort study. Lancet. 2010; 376(9734):41–48. [PubMed: 20557928]
13. Maman S, Mbwambo JK, Hogan NM, et al. HIV-positive women report more lifetime partner violence: findings from a voluntary counseling and testing clinic in Dar es Salaam, Tanzania. Am J Public Health. 2002; 92(8):1331–1337. [PubMed: 12144993]
14. Silverman JG, Decker M, Saggurti N, Balaiah D, Raj A. Intimate partner violence and HIV infection among married Indian women. JAMA. 2008; 300(6):703–710. [PubMed: 18698068]
15. Kouyoumdjian FG, Calzavara L, Bondy S, et al. Intimate partner violence is associated with incident HIV infection in women in Uganda. AIDS. 2013; 27(8):1331–1338. [PubMed: 23925380]
16. Kayibanda JF, Bitera R, Alary M. Violence toward women, men's sexual risk factors, and HIV infection among women: findings from a national household survey in Rwanda. J Acquir Immune Defic Syndr. 2012; 59(3):300–307. [PubMed: 22227491]
17. Breiding MJ, Black MC, Ryan GW. Chronic disease and health risk behaviors associated with intimate partner violence—18 US states/territories, 2005. Ann Epidemiol. 2008; 18(7):538–544. [PubMed: 18495490]

18. Coker AL. Does physical intimate partner violence affect sexual health? A systematic review. Trauma Violence Abuse. 2007; 8(2):149–177. [PubMed: 17545572]
19. Johnson SD, Cottler LB, Ben Abdallah A, O'Leary CC. History of sexual trauma and recent HIV-risk behaviors of community-recruited substance using women. AIDS Behav. 2011; 15(1):172–178. [PubMed: 20625927]
20. Stockman JK, Campbell JC, Celentano DD. Sexual violence and HIV risk behaviors among a nationally representative sample of heterosexual American women: the importance of sexual coercion. J Acquir Immune Defic Syndr. 2010; 53(1):136–143. [PubMed: 19734802]
21. Black, MC.; Basile, KC.; Breiding, MJ., et al. The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 Summary Report. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention; Atlanta, GA: 2011.
22. Harris RM, Sharps PW, Allen K, Anderson EH, Soeken K, Rohatas A. The interrelationship between violence, HIV/AIDS, and drug use in incarcerated women. J Assoc Nurses AIDS Care. 2003; 14(1):27–40. [PubMed: 12585220]
23. Wenzel SL, Tucker JS, Elliott MN, et al. Prevalence and co-occurrence of violence, substance use and disorder, and HIV risk behavior: a comparison of sheltered and low-income housed women in Los Angeles County. Prev Med. 2004; 39(3):617–624. [PubMed: 15313103]
24. Mittal M, Stockman J, Seplaki C, Thevenet-Morrison K, Guido J, Carey M. HIV risk among women from domestic violence agencies: prevalence and correlates. J Assoc Nurses AIDS Care. 2013; 24(4):322–330. [PubMed: 23790275]
25. Latkin CA, German D, Vlahov D, Galea S. Neighborhoods and HIV: a social ecological approach to prevention and care. Am Psychol. 2013; 68(4):210–224. [PubMed: 23688089]
26. Hodder SL, Justman J, Haley D, et al. Challenges of a hidden epidemic: HIV prevention among women in the United States. J Acquir Immune Defic Syndr. 2010; 55(suppl 2):S69–S73. [PubMed: 21406990]
27. El-Sadr WM, Mayer KH, Hodder SL. AIDS in America—forgotten but not gone. N Engl J Med. 2010; 362(11):967–970. [PubMed: 20147707]
28. Tucker JS, Wenzel SL, Elliott MN, Marshall G, Williamson S. Interpersonal violence, substance use, and HIV-related behavior and cognitions: a prospective study of impoverished women in Los Angeles County. AIDS Behav. 2004; 8(4):463–474. [PubMed: 15690119]
29. Romero-Daza N, Weeks M, Singer M. “Nobody gives a damn if I live or die”: violence, drugs, and street-level prostitution in inner-city Hartford, Connecticut. Med Anthropol. 2003; 22(3):233–259. [PubMed: 12893541]
30. Singer M. AIDS and the health crisis of the US urban poor: the perspective of critical medical anthropology. Soc Sci Med. 1994; 39(7):931–948. [PubMed: 7992126]
31. Gielen AC, Ghandour RM, Burke JG, Mahoney P, McDonnell KA, O'Campo P. HIV/AIDS and intimate partner violence: intersecting women's health issues in the United States. Trauma, Violence, Abuse. 2007; 8(2):178–198. [PubMed: 17545573]
32. Goodman LA, Smyth KF, Borges AM, Singer R. When crises collide: how intimate partner violence and poverty intersect to shape women's mental health and coping? Trauma Violence Abuse. 2009; 10(4):306–329. [PubMed: 19776085]
33. Surratt HL, Kurtz SP, Chen M, Mooss A. HIV risk among female sex workers in Miami: the impact of violent victimization and untreated mental illness. AIDS Care. 2012; 24(5):553–561. [PubMed: 22085330]
34. Illangasekare S, Burke J, Chander G, Gielen A. The syndemic effects of intimate partner violence, HIV/AIDS, and substance abuse on depression among low-income urban women. J Urban Health. 2013; 90(5):934–947. [PubMed: 23529665]
35. Hodder SL, Justman J, Hughes JP, et al. the HIV Prevention Trials Network 064; the Women's HIV SeroIncidence Study Team. HIV acquisition among women from selected areas of the United States: a cohort study. Ann Intern Med. 2013; 158(1):10–18. [PubMed: 23277896]
36. DeNavas-Walt, C.; Proctor, B.; Smith, J. Income, Poverty, and Health Insurance Coverage in the United States: 2008. US Government Printing Office; Washington, DC: 2009. p. P60-236.

37. Gallagher KM, Sullivan PS, Lansky A, Onorato IM. Behavioral surveillance among people at risk for HIV infection in the US: the National HIV Behavioral Surveillance System. Public Health Rep. 2007; 122(suppl 1):32–38. [PubMed: 17354525]
38. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Meas. 1977; 1(3):385–401.
39. DiClemente RJ, Wingood GM, Crosby RA, et al. A prospective study of psychological distress and sexual risk behavior among black adolescent females. Pediatrics. 2001; 108(5):E85. [PubMed: 11694669]
40. Prins A, Ouimette P, Kimerling RP, et al. The primary care PTSD screen (PC-PTSD): development and operating characteristics. Prim Care Psychiatry. 2003; 9(1):9–14.
41. WHO ASSIST Working Group. The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): development, reliability and feasibility. Addiction. 2002; 97(9):1183–1194. [PubMed: 12199834]
42. Adimora AA, Hughes JP, Wang J, et al. Characteristics of multiple and concurrent partnerships among women at high risk for HIV Infection. J Acquir Immune Defic Syndr. 2014; 65(1):99–106. [PubMed: 24056163]
43. *Help and Documentation* [computer program]. Version SAS 9.1.3.. SAS Institute Inc.; Cary, NC: 2004.
44. Jina R, Jewkes R, Hoffman S, Dunkle K, Nduna M, Shai N. Adverse mental health outcomes associated with emotional abuse in young rural South African women: a cross-sectional study. J Interpers Violence. 2012; 27(5):862–880. [PubMed: 21987516]
45. Jewkes R. Emotional abuse: a neglected dimension of partner violence. Lancet. 2010; 376(9744): 851–852. [PubMed: 20822808]
46. Yoshihama M, Horrocks J, Kamano S. The role of emotional abuse in intimate partner violence and health among women in Yokohama, Japan. Am J Public Health. 2009; 99(4):647–653. [PubMed: 18703455]
47. Garcia-Moreno C, Jansen H, Ellsberg M, Heise L, Watts C, WHO Multi-country Study on Women's Health and Domestic Violence against Women Study Team. Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. Lancet. 2006; 368(9543):1260–1269. [PubMed: 17027732]
48. Ellsberg, M.; Heise, L. Researching Violence Against Women: A Practical Guide for Researchers and Activists. PATH, World Health Organization; Washington, DC: 2005.
49. Ellsberg M, Heise L, Peña R, Agurto S, Winkvist A. Researching domestic violence against women: methodological and ethical considerations. Stud Fam Plann. 2001; 32(1):1–16. [PubMed: 11326453]
50. Melchior M, Caspi A, Howard LM, et al. Mental health context of food insecurity: a representative cohort of families with young children. Pediatrics. 2009; 124(4):e564–e572. [PubMed: 19786424]
51. Power EM. Economic abuse and intra-household inequities in food security. Can J Public Health. 2006; 97(3):258–260. [PubMed: 16827421]
52. Postmus JL, Plummer SB, McMahon S, Murshid NS, Kim MS. Understanding economic abuse in the lives of survivors. J Interpers Violence. 2012; 27(3):411–430. [PubMed: 21987509]
53. Pronyk PM, Hargreaves JR, Kim J, et al. Effect of a structural intervention for the prevention of intimate-partner violence and HIV in rural South Africa: a cluster randomised trial. Lancet. 2006; 368(9551):1973–1983. [PubMed: 17141704]
54. Adimora AA, Schoenbach V. Contextual factors and the black-white disparity in heterosexual HIV transmission. Epidemiology. 2002; 13(6):707–712. [PubMed: 12410013]
55. Adimora AA, Schoenbach VJ. Social context, sexual networks, and racial disparities in rates of sexually transmitted infections. J Infect Dis. 2005; 191(suppl 1):S115–S122. [PubMed: 15627221]
56. Abramsky T, Watts C, Garcia-Moreno C, et al. What factors are associated with recent intimate partner violence? Findings from the WHO Multi-country Study on Women's Health and Domestic Violence. BMC Public Health. 2011; 11:109. [PubMed: 21324186]
57. Sharpe TT, Voûte C, Rose M, Cleveland J, Dean H, Fenton K. Social determinants of HIV/AIDS and sexually transmitted diseases among black women: implications for health equity. J Womens Health (Larchmt). 2012; 21(3):249–254. [PubMed: 22196231]

58. Rees S, Silove D, Chey T, et al. Lifetime prevalence of gender-based violence in women and the relationship with mental disorders and psychosocial function. JAMA. 2011; 306(5):513–521. [PubMed: 21813429]
59. Trevillion K, Oram S, Feder G, Howard L. Experiences of domestic violence and mental disorders: a systematic review and meta-analysis. PLoS ONE. 2012; 7(12):e51740. [PubMed: 23300562]
60. Cavanaugh CE, Hansen N, Sullivan T. HIV sexual risk behavior among low-income women experiencing intimate partner violence: the role of posttraumatic stress disorder. AIDS Behav. 2010; 14(2):318–327. [PubMed: 19856093]
61. Tsai AC. Intimate partner violence and population mental health: why poverty and gender inequities matter. PLoS Med. 2013; 10(5):e1001440. [PubMed: 23667344]
62. Devries KM, Mak J, Bacchus L, et al. Intimate partner violence and incident depressive symptoms and suicide attempts: a systematic review of longitudinal studies. PLoS Med. 2013; 10(5):e1001439. [PubMed: 23671407]
63. Campbell JC, Baty ML, Ghandour RM, Stockman JK, Francisco L, Wagman J. The intersection of intimate partner violence against women and HIV/AIDS: a review. Int J Inj Contr Saf Promot. 2008; 15(4):221–231. [PubMed: 19051085]
64. NIMH Multisite HIV/STD Prevention Trial for African American Couples Group. Prevalence of child and adult sexual abuse and risk taking practices among HIV serodiscordant African-American couples. AIDS Behav. 2010; 14(5):1032–1044. [PubMed: 20499150]
65. Powers KA, Poole C, Pettifor AE, Cohen MS. Rethinking the heterosexual infectivity of HIV-1: a systematic review and meta-analysis. Lancet Infect Dis. 2008; 8(9):553–563. [PubMed: 18684670]
66. Stith SM, Smith DB, Penn CE, Ward DB, Tritt D. Intimate partner physical abuse perpetration and victimization risk factors: a meta-analytic review. Aggress Violent Behav. 2004; 10(1):65–98.
67. Coker AL, Smith PH, McKeown RE, King MJ. Frequency and correlates of intimate partner violence by type: physical, sexual, and psychological battering. Am J Public Health. 2000; 90(4): 553–559. [PubMed: 10754969]
68. Singer M. A dose of drugs, a touch of violence, a case of AIDS: conceptualizing the SAVA syndemic. Free Inq Creat Sociol. 1996; 24(2):99–110.
69. Singer M, Clair S. Syndemics and public health: reconceptualizing disease in bio-social context. Med Anthropol Q. 2003; 17(4):423–441. [PubMed: 14716917]
70. Davila YR, Bonilla E, Gonzalez-Ramirez D, Grinslade S, Villarruel A. Pilot testing HIV and intimate partner violence prevention modules among Spanish-speaking Latinas. J Assoc Nurses AIDS Care. 2008; 19(3):219–224. [PubMed: 18457763]
71. Jewkes R, Nduna M, Levin J, et al. Impact of stepping stones on incidence of HIV and HSV-2 and sexual behaviour in rural South Africa: cluster randomised controlled trial. BMJ. 2008; 337:a506. [PubMed: 18687720]
72. Wyatt GE, Hamilton AB, Myers H, et al. Violence prevention among HIV-positive women with histories of violence: healing women in their communities. Womens Health Issues. 2011; 21(6, suppl):S255–S260. [PubMed: 22055676]
73. Sikkema KJ, Wilson PA, Hansen N, et al. Effects of a coping intervention on transmission risk behavior among people living with HIV/AIDS and a history of childhood sexual abuse. J Acquir Immune Defic Syndr. 2008; 47(4):506–513. [PubMed: 18176319]
74. Sikkema KJ, Hansen N, Kochman A, et al. Outcomes from a group intervention for coping with HIV/AIDS and childhood sexual abuse: reductions in traumatic stress. AIDS Behav. 2007; 11(1): 49–60. [PubMed: 16858634]
75. Williams JK, Glover DA, Wyatt GE, Kisler K, Liu H, Zhang M. A sexual risk and stress reduction intervention designed for HIV-positive bisexual African American men with childhood sexual abuse histories. Am J Public Health. 2013; 103(8):1476–1484. [PubMed: 23763412]
76. Hardee K, Gay J, Croce-Galis M, Peltz A. Strengthening the enabling environment for women and girls: what is the evidence in social and structural approaches in the HIV response? J Int AIDS Soc. 2014; 17:18619. [PubMed: 24405664]
77. Chin D, Myers HF, Zhang M, et al. Who improved in a trauma intervention for HIV-positive women with child sexual abuse histories? Psychol Trauma. 2014; 6(2):152–158. [PubMed: 25202437]

78. Ross DA. Behavioural interventions to reduce HIV risk: what works? AIDS. 2010; 24(suppl 4):S4–S14. [PubMed: 21042051]

79. Marrazzo, J.; Ramjee, G.; Nair, G., et al. Pre-exposure prophylaxis for HIV in women: daily oral tenofovir, oral tenofovir/emtricitabine or vaginal tenofovir gel in the VOICE study (MTN 003).. Presented at 20th Conference on Retroviruses and Opportunistic Infections; Atlanta, GA. March 3–6, 2013;

80. Van Damme L, Corneli A, Ahmed K, et al. Pre-exposure prophylaxis for HIV infection among African women. N Engl J Med. 2012; 367(5):411–422. [PubMed: 22784040]

81. Locke SE, Kowaloff HB, Hoff RG, et al. Computer-based interview for screening blood donors for risk of HIV transmission. JAMA. 1992; 268(10):1301–1305. [PubMed: 1507376]

82. Turner CF, Ku L, Rogers SM, Lindberg L, Pleck J, Sonenstein F. Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. Science. 1998; 280(5365):867–873. [PubMed: 9572724]

TABLE 1

Selected Demographic Characteristics by Prevalence Estimates of Violence or Abuse in 6 Months Before Enrollment: United States, 2009-2010

Characteristic	Entire Cohort No.	Type of Abuse or Violence			
		Emotional, No. (%)	Physical, No. (%)	Sexual, No. (%)	Multiple,[a] No. (%)
All	2099	656 (31.3)	401 (19.1)	148 (7.1)	353 (16.8)
Age, y					
18-26	837	276 (33.0)	181 (21.6)	47 (5.6)	150 (17.9)
27-33	502	157 (31.3)	87 (17.3)	32 (6.4)	76 (15.1)
≥ 34	760	223 (29.3)	133 (17.5)	69 (9.1)	127 (16.7)
Race					
African American	1802	553 (30.7)	344 (19.1)	125 (6.9)	298 (16.5)
Non-African American	297	103 (34.7)	57 (19.2)	23 (7.7)	55 (18.5)
Hispanic ethnicity					
Yes	245	73 (29.8)	41 (16.7)	17 (6.9)	41 (16.7)
No	1854	583 (31.5)	360 (19.4)	131 (7.1)	312 (16.8)
Marital status					
Married	159	45 (28.3)	21 (13.2)	6 (3.8)	16 (10.1)
Not married, living together	479	140 (29.2)	92 (19.2)	23 (4.8)	74 (15.5)
Nonpartnered	1410	460 (32.6)	280 (19.9)	116 (8.2)	257 (18.2)
Recruitment region					
North	840	228 (27.1)	135 (16.1)	44 (5.2)	117 (13.9)
Mid-Atlantic	418	119 (28.5)	67 (16.0)	36 (8.6)	60 (14.4)
South	841	309 (36.7)	199 (23.7)	68 (8.1)	176 (20.9)
Education					
< high school	777	248 (31.9)	164 (21.1)	54 (7.0)	143 (18.4)
≥ high school	1322	408 (30.9)	237 (17.9)	94 (7.1)	210 (15.9)
Income, $					
≤ 10 000	933	309 (33.1)	195 (20.9)	76 (8.2)	174 (18.7)
> 10 000	422	127 (30.1)	69 (16.4)	25 (5.9)	60 (14.2)
Refused/don't know	744	220 (29.6)	137 (18.4)	47 (6.3)	119 (16.0)
Unemployed					
Yes	1357	433 (31.9)	270 (19.9)	107 (7.9)	241 (17.8)
No	742	223 (30.1)	131 (17.7)	41 (5.5)	112 (15.1)
Food insecurity					
Yes	971	421 (43.4)	272 (28.0)	101 (10.4)	247 (25.4)
No	1101	232 (21.1)	126 (11.4)	46 (4.2)	103 (9.4)
Stable housing					
Owner/renter	832	229 (27.5)	126 (15.1)	46 (5.5)	104 (12.5)
Lives with partner, friend, or parent	880	294 (33.4)	186 (21.1)	58 (6.6)	168 (19.1)
Unstable housing	357	130 (36.4)	88 (24.7)	43 (12.0)	80 (22.4)

Characteristic	Entire Cohort No.	Type of Abuse or Violence			
		Emotional, No. (%)	Physical, No. (%)	Sexual, No. (%)	Multiple,[a] No. (%)
Poor health status					
Yes	26	12 (46.2)	6 (23.1)	3 (11.5)	6 (23.1)
No	2069	643 (31.1)	395 (19.1)	145 (7.0)	347 (16.8)
Depression[b]					
Yes	692	338 (48.8)	219 (31.7)	88 (12.7)	212 (30.6)
No	1250	281 (22.5)	156 (12.5)	49 (3.9)	121 (9.7)
PTSD[c]					
Yes	600	324 (54.0)	195 (32.5)	89 (14.8)	197 (32.8)
No	1447	325 (22.5)	198 (13.7)	55 (3.8)	152 (10.5)
Childhood abuse					
Yes	934	427 (45.7)	255 (27.3)	98 (10.5)	242 (25.9)
No	1136	226 (19.9)	143 (12.6)	49 (4.3)	109 (9.6)
At least weekly binge drinking					
Yes	498	186 (37.4)	130 (26.1)	55 (11.0)	120 (24.1)
No	1569	468 (29.8)	269 (17.1)	91 (5.8)	231 (14.7)
At least weekly drug use					
Yes	459	190 (41.4)	123 (26.8)	60 (13.1)	122 (26.6)
No	1624	465 (28.6)	278 (17.1)	88 (5.4)	231 (14.2)
HIV seropositive					
Yes	30	6 (20.0)	4 (13.3)	1 (3.3)	5 (16.7)
No	2069	650 (31.4)	397 (19.2)	147 (7.1)	348 (16.8)
Unprotected vaginal sex					
Yes	1698	525 (30.9)	314 (18.5)	123 (7.2)	280 (16.5)
No	376	123 (32.7)	83 (22.1)	24 (6.4)	69 (18.4)
Unprotected anal sex					
Yes	637	218 (34.2)	157 (24.7)	66 (10.4)	146 (22.9)
No	1441	430 (29.8)	237 (16.5)	78 (5.4)	201 (14.0)
Previous STI diagnosis (self-reported)					
Yes	232	103 (44.4)	67 (28.9)	27 (11.6)	62 (26.7)
No	1834	549 (29.9)	331 (18.1)	120 (6.5)	288 (15.7)
Multiple sex partners					
Yes	1228	458 (37.3)	305 (24.8)	118 (9.6)	282 (23.0)
No	850	192 (22.6)	93 (11.0)	28 (3.3)	68 (8.0)
Concurrent partnerships					
Yes	776	327 (42.1)	207 (26.7)	85 (11.0)	207 (26.7)
No	1314	326 (24.8)	193 (14.7)	62 (4.7)	145 (11.0)
Exchanged sex					
Yes	776	345 (44.5)	225 (29.0)	100 (12.9)	218 (28.1)
No	1302	305 (23.4)	173 (13.3)	46 (3.5)	132 (10.1)

Characteristic	Entire Cohort No.	Type of Abuse or Violence			
		Emotional, No. (%)	Physical, No. (%)	Sexual, No. (%)	Multiple,[a] No. (%)
Commercial sex worker					
Yes	117	61 (52.1)	42 (35.9)	34 (29.1)	47 (40.2)
No	1885	553 (29.3)	325 (17.2)	100 (5.3)	271 (14.4)
Incarcerated partner					
Yes	1233	438 (35.5)	269 (21.8)	101 (8.2)	249 (20.2)
No	866	218 (25.2)	132 (15.2)	47 (5.4)	104 (12.0)
Drug-using partner					
Yes	752	319 (42.4)	210 (27.9)	96 (12.8)	202 (26.9)
No	1347	337 (25.0)	191 (14.2)	52 (3.9)	151 (11.2)
At least weekly binge drinking partner					
Yes	1179	440 (37.3)	273 (23.2)	110 (9.3)	251 (21.3)
No	920	216 (23.5)	128 (13.9)	38 (4.1)	102 (11.1)
Indirect concurrency					
Yes	763	331 (43.4)	220 (28.8)	88 (11.5)	208 (27.3)
No	1336	325 (24.3)	181 (13.6)	60 (4.5)	145 (10.9)

Note. STI = sexually transmitted infection. Total does not add to 2099 because of missing data.

[a]Two or more types of violence or abuse reported.

[b]Depression is a score of ≥ 7 on a 4-point Center for Epidemiologic Studies-Depression Scale ranging from 0 to 3, indicating depressive symptoms in the past week.

[c]Posttraumatic stress disorder (PTSD) is a score of 3 on the 4-item dichotomous Primary Care PTSD Screen, indicating symptoms of PTSD in the past 6 months.

TABLE 2

Bivariate Analysis for Type of Violence or Abuse in Past 6 Months: HPTN 064 Women's Sero-incidence Study, United States, 2009-2010

Characteristic	Type of Abuse or Violence			
	Emotional, OR (95% CI)	Physical, OR (95% CI)	Sexual, OR (95% CI)	Multiple,[a] OR (95% CI)
Age, y				
27-33 vs 18-26	0.92 (0.73, 1.17)	0.76 (0.57, 1.01)	1.15 (0.72, 1.83)	0.82 (0.61, 1.17)
≥ 34 vs 18-26	0.84 (0.68, 1.04)	0.77* (0.59, 0.99)	1.69* (1.15, 2.48)	0.92 (0.61, 1.11)
Race				
African American vs non-African American	0.85 (0.65, 1.09)	1.01 (0.74, 1.37)	0.90 (0.57, 1.43)	0.88 (0.64, 1.21)
Hispanic ethnicity	0.91 (0.68, 1.21)	0.82 (0.58, 1.17)	0.97 (0.57, 1.63)	0.98 (0.69, 1.40)
Marital status				
Nonpartnered vs married	1.23 (0.86, 1.77)	1.63* (1.01, 2.63)	2.30 (0.99, 5.32)	2.0* (1.17, 3.40)
Not married, living together vs married	1.05 (0.70, 1.56)	1.56 (0.94, 2.61)	1.29 (0.52, 3.23)	1.63 (0.92, 2.89)
< high school education	1.05 (0.87, 1.28)	1.23 (0.99, 1.54)	0.99 (0.70, 1.40)	1.20 (0.95, 1.51)
Unemployed	1.12 (0.92, 1.36)	1.18 (0.94, 1.49)	1.50* (1.03, 2.17)	1.24 (0.97, 1.59)
Food insecurity	2.87*** (2.37, 3.48)	3.01*** (2.39, 3.79)	2.67*** (1.86, 3.83)	3.30*** (2.57, 4.23)
Stable housing				
Unstable vs owner/renter	1.51** (1.16, 1.97)	1.84*** (1.35, 2.50)	2.36** (1.53, 3.65)	2.03*** (1.47, 2.80)
Living with partner, friend, or parent vs owner/renter	1.32** (1.07, 1.63)	1.51** (1.74, 1.93)	1.20 (0.81, 1.79)	1.65** (1.27, 2.15)
Poor health status	2.19 (0.98, 4.89)	1.40 (0.55, 3.54)	1.87 (0.55, 6.34)	1.64 (0.65, 4.16)
Depression	3.30*** (2.71, 4.04)	3.26*** (2.59, 4.11)	3.59*** (2.49, 5.16)	4.14*** (3.23, 5.30)
PTSD	4.08*** (3.33, 4.97)	3.05*** (2.43, 3.83)	4.44*** (3.12, 6.31)	4.18*** (3.29, 5.30)
Childhood abuse, lifetime	3.38*** (2.79, 4.11)	2.61*** (2.08, 3.27)	2.59*** (1.82, 6.69)	3.30*** (2.58, 4.21)
At least weekly binge drinking	1.40** (1.13, 1.73)	1.71*** (1.34, 2.17)	2.01** (1.41, 2.85)	1.84*** (1.43, 2.35)
At least weekly drug use	1.77*** (1.43, 2.19)	1.79*** (1.40, 2.29)	2.64*** (1.87, 3.73)	2.20*** (1.71, 2.82)
Unprotected vaginal sex	0.91 (0.72, 1.16)	0.80 (0.61, 1.05)	1.13 (0.72, 1.78)	0.87 (0.65, 1.17)
Unprotected anal sex	1.24*** (1.02, 1.51)	1.68*** (1.34, 2.11)	2.04*** (1.45, 2.88)	1.86*** (1.46, 2.35)
Previous self-reported STI diagnosis	1.87*** (1.42, 2.47)	1.83** (1.35, 2.49)	1.87** (1.19, 2.90)	1.95*** (1.42, 2.68)
Multiple sex partners	2.08*** (1.71, 2.54)	2.72*** (2.12, 3.50)	3.16*** (2.07, 4.81)	3.47*** (2.62, 4.60)
Concurrent partnerships	2.23*** (1.85, 2.70)	2.14*** (1.71, 2.66)	2.51*** (1.78, 3.52)	2.97*** (2.34, 3.75)
Exchanged sex	2.67*** (2.19, 3.23)	2.71*** (2.17, 3.39)	4.09*** (2.85, 5.88)	3.50*** (2.76, 4.44)
Self-identified as CSW	2.74 (1.87, 4.01)	2.81*** (1.83, 4.19)	7.49*** (4.78, 11.70)	4.14*** (2.79, 6.14)
Incarcerated partner	1.65*** (1.36, 1.99)	1.55** (1.23, 1.95)	1.56* (1.09, 2.22)	1.86*** (1.45, 2.39)

Characteristic	Type of Abuse or Violence			
	Emotional, OR (95% CI)	Physical, OR (95% CI)	Sexual, OR (95% CI)	Multiple,[a] OR (95% CI)
Drug-using partner	2.25*** (1.86, 2.73)	2.38*** (1.91, 2.97)	3.71*** (2.61. 5.27)	2.94*** (2.33, 3.72)
Binge drinking partner	1.95*** (1.61, 2.37)	1.87*** (1.48, 2.35)	2.38*** (1.63, 3.48)	2.17*** (1.69, 2.79)
Indirect concurrency	2.39*** (1.98, 2.89)	2.59*** (2.08, 3.24)	2.77*** (1.97, 3.90)	3.08*** (2.44, 3.89)

Note. CI = confidence interval; CSW = commercial sex worker; HPTN = HIV Prevention Trials Network; OR = odds ratio; PTSD = posttraumatic stress disorder; STI = sexually transmitted infection. The sample size was n = 2099.

[a]Two or more types of violence or abuse reported.

*$P < .05$

**$P < .01$

***$P < .001$.

TABLE 3

Multivariable Logistic Regressions and Correlates for Type of Violence or Abuse in Past 6 Months: HPTN 064 Women's Sero-incidence Study, United States, 2009-2010

Characteristic	Type of Abuse or Violence			
	Emotional, AOR (95% CI)	Physical, AOR (95% CI)	Sexual, AOR (95% CI)	Multiple,[a] AOR (95% CI)
Age, y				
27-33 vs 18-26	NI	0.68* (0.47, 0.98)	1.00 (0.55, 1.82)	NI
≥ 34 vs 18-26	NI	0.58** (0.40, 0.84)	1.03 (0.56, 1.88)	NI
Race				
African American vs non-African American	NI	NI	NI	NI
Hispanic ethnicity	NI	NI	NI	NI
Marital status				
Nonpartnered vs married	NI	1.89 (1.00, 3.57)	2.90* (1.00, 8.42)	2.53* (1.21, 5.30)
Not married, living together vs married	NI	2.14* (1.09, 4.20)	1.82 (0.58, 5.68)	2.41* (1.11, 5.22)
< high school education	NI	1.03 (0.77, 1.37)	NI	NI
Unemployed	NI	NI	1.10 (0.68, 1.77)	1.04 (0.76, 1.44)
Food insecurity	1.79*** (1.41, 2.28)	1.98*** (1.48, 2.65)	1.40 (0.88, 2.24)	1.93*** (1.41, 2.65)
Stable housing				
Unstable vs owner/renter	1.08 (0.77, 1.51)	1.33 (0.91, 1.97)	1.39 (0.79, 2.47)	1.33 (0.88, 2.03)
Living with partner, friend, or parent vs owner/renter	1.40** (1.09, 1.80)	1.30 (0.95, 1.78)	0.90 (0.54, 1.50)	1.57** (1.12, 2.20)
Poor health status	1.28 (0.48, 3.38)	NI	NI	NI
Depression	1.80*** (1.39, 2.34)	1.96*** (1.44, 2.67)	1.52 (0.95, 2.43)	2.07*** (1.49, 2.85)
PTSD	1.98*** (1.53, 2.57)	1.31 (0.96, 1.80)	2.38** (1.46, 3.87)	1.69 (1.21, 2.35)**
Childhood abuse	2.04*** (1.61, 2.58)	1.71** (1.28, 2.27)	1.42 (0.89, 2.27)	1.89 (1.38, 2.59)**
At least weekly binge drinking	0.79 (0.59, 1.05)	0.97 (0.71, 1.34)	0.78 (0.49, 1.22)	0.86 (0.61, 1.21)
At least weekly drug use	1.04 (0.75, 1.43)	1.22 (0.85, 1.77)	1.09 (0.63, 1.89)	1.09 (0.75, 1.58)
Unprotected vaginal sex	NI	NI	NI	NI
Unprotected anal sex	0.98 (0.76, 1.26)	1.47** (1.11, 1.96)	1.68* (1.10, 2.57)	1.61** (1.19, 2.19)
Previous self-reported STI diagnosis	1.52* (1.08, 2.16)	1.33 (0.91, 1.94)	1.13 (0.64, 1.99)	1.44 (0.95, 2.17)
Multiple sex partners	0.92 (0.68, 1.24)	1.29 (0.88, 1.87)	1.22 (0.61, 2.42)	1.29 (0.84, 1.97)
Concurrent partnerships	1.24 (0.94, 1.64)	1.00 (0.72, 1.38)	0.99 (0.59, 1.68)	1.27 (0.90, 1.80)
Exchanged sex	1.40* (1.06, 1.85)	1.26 (0.91, 1.75)	1.26 (0.73, 2.16)	1.23 (0.86, 1.76)
CSW	1.05 (0.63, 1.75)	0.98 (0.58, 1.63)	2.59* (1.43, 4.71)	1.32 (0.78, 2.22)
Incarcerated partner	1.26 (0.99, 1.61)	1.15 (0.86, 1.53)	1.02 (0.64, 1.63)	1.30 (0.95, 1.77)
Drug-using partner	1.20 (0.92, 1.57)	1.41* (1.02, 1.96)	1.91** (1.18, 3.07)	1.46* (1.04, 2.05)

Characteristic	Type of Abuse or Violence			
	Emotional, AOR (95% CI)	Physical, AOR (95% CI)	Sexual, AOR (95% CI)	Multiple,[a] AOR (95% CI)
Binge drinking partner	1.58** (1.25, 2.01)	1.27 (0.95, 1.70)	1.40 (0.87, 2.25)	1.40* (1.02, 1.92)
Indirect concurrency	1.53** (1.18, 1.97)	1.40* (1.03, 1.89)	1.41 (0.84, 2.35)	1.56** (1.13, 2.16)

Note. AOR = adjusted odds ratio; CI = confidence interval; CSW = commercial sex worker; HPTN = HIV Prevention Trials Network; NI = not included in final model because bivariate $P > .1$; PTSD = posttraumatic stress disorder; STI = sexually transmitted infection. The sample size was n = 2099.

[a] Two or more types of violence or abuse reported.

* $P < .05$

** $P < .01$

*** $P < .001$.